PATENT ABSTRACTS OF JAPAN

(11)Publication number :   2001-306259

(43)Date of publication of application :   02.11.2001

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(51)Int.Cl.   G06F   3/033
     G06F   3/03

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(54) TOUCH PANEL SCAN SYSTEM

(57)Abstract:
PROBLEM TO BE SOLVED: To obtain accurate coordinate data even when chatter occurs in a touch panel device.
SOLUTION: At the time of converting a measured voltage value measured according to a touch position when a touch panel is touched into the coordinate data of the touch position, and outputting the coordinate data, when the touch panel is touched, a measured voltage value is measured plural times, and the first measured voltage value is defined as a reference voltage value, and the second and following measured voltage values are defined as comparison voltage values. The reference voltage value and the comparison voltage values are successively compared, and when they are continuously matched the preliminarily decided specific number of times, the reference voltage value or the comparison value are converted into coordinate data.

CLAIMS

[Claim(s)]
[Claim 1] It is used in case the measurement electrical-potential-difference value measured according to the touch location when touched in a touch panel is changed and outputted to the coordinate data of said touch location. The 1st means which carries out multiple-times measurement of said measurement electrical-potential-difference value, makes the 1st measurement electrical-potential-difference value a reference voltage level, and makes the measurement electrical-potential-difference value of the 2nd henceforth a comparison electrical-potential-difference value when touched in said touch panel, The touch panel scanning method characterized by having 2nd means continuously defined beforehand by carrying out the sequential comparison of said reference voltage level and said comparison electrical-potential-difference value to change said measurement electrical-potential-difference value into said coordinate data if count coincidence of a convention is carried out.

[Claim 2] In the touch panel scanning method indicated by claim 1 said 2nd means It is considering as the count by making into coincidence counted value the count which carried out the sequential comparison of said reference voltage level and said comparison electrical-potential-difference value, and was in agreement. that said reference voltage and said n-th comparison electrical-potential-difference value (n is two or more integers) are inharmonious The touch panel scanning method characterized by carrying out it as said coincidence counted value was initialized while making said n-th comparison electrical-potential-difference value into said reference voltage level.

[Claim 3] Said 2nd means is a touch panel scanning method characterized by changing said reference voltage level or said comparison electrical-potential-difference value into said coordinate data when said coincidence counted value became said count of a convention in the touch panel scanning method indicated by claim 2.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the touch panel scanning method used with the information terminal unit operated with a touch pen etc.
[0002]
[Description of the Prior Art] Generally, in information terminal units, such as a scheduler or a personal digital assistant, there is a thing equipped with the so-called touch panel. In such an information terminal unit, if a touch panel is pressed with a touch pen etc. in the case of a touch panel scan, the multiple-times sampling of the electrical-potential-difference value is carried out, and the average of these sampling value is taken and it is considering as the coordinate data.
[0003] Here, with reference to <u>drawing 2</u> , it outlines about the principle of a touch panel scan.
[0004] Generally, the touch panel is equipped with two resistance plates 11 and 12 (here, the up resistance plate 11, and a call and the lower resistance plate 12 are called the lower resistance plate 12 for the upper resistance plate 11), and these up resistance plate 11 and the lower resistance plate 12 are arranged by the parallel condition with the distance of extent which does not contact mutually. Like illustration, an electrical potential difference is exclusively impressed to a longitudinal direction (X shaft orientations) among drawing at the up resistance plate 11, and an electrical potential difference is exclusively impressed to the lower resistance plate 11 among drawing in a lengthwise direction (Y shaft orientations).

[0005] Electrodes 11a and 11b are formed in the both ends of the direction of X coordinate at the up resistance plate 11, respectively, Electrodes 12a and 12b are formed in the both ends of the direction of Y coordinate at the lower resistance plate 12, respectively, Electrodes 11a and 12a are alternatively connected to a power source (E) through a switch 13, and Electrodes 11b and 12b are grounded through a switch 14. In addition, switches 13 and 14 interlock. Furthermore, Electrodes 11b and 12b are connected to the control unit (CPU) 15.

[0006] If a touch panel is now touched with the touch pen 16, the up resistance plate 11 and the lower resistance plate 12 will contact on the press point (input point) (if it presses). Consequently, like illustration, in an input point, the electrical potential difference (henceforth an X-axis electrical potential difference) the partial pressure was carried out [the electrical potential difference] by resistance Rx1 and resistance Rx2 appears, and the electrical potential difference (henceforth a Y-axis electrical potential difference) the partial pressure was carried out [the electrical potential difference] by resistance Ry1 and resistance Ry2 appears with the lower resistance plate 12 with the up resistance plate 11. These X-axes electrical potential difference and a Y-axis electrical potential difference (electrical-potential-difference values ADx and ADy) are given to CPU15, and CPU15 changes and outputs an X-axis electrical potential difference and a Y-axis electrical potential difference to coordinate data.

[0007] Since an X-axis electrical potential difference and a Y-axis electrical potential difference change according to the input point of the touch pen 16 so that clearly from above-mentioned explanation, as for CPU15, the coordinate data on a touch panel can be obtained with an X-axis electrical potential difference and a Y-axis electrical potential difference.

[0008] In case coordinate data is obtained conventionally, CPU15 is performing the following sequence.

[0009] If drawing 3 is also referred to and a touch panel is touched with the touch pen 16, an X-axis electrical potential difference and a Y-axis electrical potential difference will be given to CPU15 as mentioned above (that is, CPU15 measures an electrical-potential-difference value.). Step S1. And in CPU15, while adding this measurement electrical-potential-difference value to a front measurement electrical-potential-difference value, a measurement count is incremented (step S2). Then, it judges whether the measurement count turned into a count of a convention (step S3).

[0010] Thus, if step S1 thru/or S3 are performed and a measurement count turns into a count of a convention, CPU15 will compute the average electrical-potential-difference value of a measurement electrical potential difference (step S4). That is, it asks for the aggregate value (total value)/count of a convention of a measurement electrical-potential-difference value. And this average

electrical-potential-difference value is changed into coordinate data, and CPU15 notifies it (step S5).

[0011]

[Problem(s) to be Solved by the Invention] By the way, by the touch panel, when a touch panel is touched with a touch pen, it is a premise that the thrust is solid, that is, it is a premise that thrust is strong to some extent, for example, when a touch panel is traced lightly, the contact location of an up resistance plate and a lower resistance plate is not fixed, and the so-called chatter occurs frequently.

[0012] Thus, when the electrical-potential-difference value which a coordinate value was not changed by having made the actually touched coordinate value (coordinate value considered to be the right) into the median, thus was measured when chatter occurred is equalized, there is a trouble that a different coordinate value from the actually touched coordinate value (location) will be obtained.

[0013] That is, by the conventional touch panel scanning method, when chatter occurs, there is a trouble that an exact coordinate value is not obtained.

[0014] The purpose of this invention is to offer the touch panel scanning method which can obtain an exact coordinate value, even if chatter occurs.

[0015]

[Means for Solving the Problem] It is used in case the measurement electrical-potential-difference value measured according to the touch location when touched in a touch panel is changed and outputted to the coordinate data of said touch location according to this invention. The 1st means which carries out multiple-times measurement of said measurement electrical-potential-difference value, makes the 1st measurement electrical-potential-difference value a reference voltage level, and makes the measurement electrical-potential-difference value of the 2nd henceforth a comparison electrical-potential-difference value when touched in said touch panel, If count coincidence of a convention is carried out, the touch panel scanning method characterized by having 2nd means continuously defined beforehand by carrying out the sequential comparison of said reference voltage level and said comparison electrical-potential-difference value to change said measurement electrical-potential-difference value into said coordinate data will be acquired.

[0016] Furthermore, said 2nd means is considered as the count by making into coincidence counted value the count which carried out the sequential comparison of said reference voltage level and said comparison electrical-potential-difference value, and was in agreement. that said reference voltage and said n-th comparison electrical-potential-difference value (n is two or more integers) are inharmonious If you are trying to initialize said coincidence counted value and said coincidence counted value serves as said count of a convention while making said n-th comparison electrical-potential-difference value into said reference voltage level, said reference voltage level or said comparison electrical-potential-difference value will be

changed into said coordinate data.

[0017]

[Embodiment of the Invention] This invention is explained based on the gestalt of operation below.

[0018] The touch panel equipment used by this invention is equipment shown in drawing 2 , and in this invention, since the function of CPU15 differs from the function explained in relation to drawing 3 , if it is in charge of explanation of the gestalt of operation, it sets the reference number of CPU to 21 in drawing 2 .

[0019] In this invention, CPU21 performs the sequence shown in drawing 1 . If a touch panel is touched with the touch pen 16 with reference to drawing 1 and drawing 2 , an X-axis electrical potential difference and a Y-axis electrical potential difference will be given to CPU21 (that is, CPU21 measures an electrical-potential-difference value). That is, if a touch panel is touched with the touch pen 16, first, CPU21 will measure the first electrical-potential-difference value, and will make this first measurement electrical-potential-difference value the basic electrical-potential-difference value Va (step P1). Then, CPU21 measures the electrical-potential-difference value of a two-times eye, and makes the measurement electrical-potential-difference value of this two-times eye the comparison electrical-potential-difference value Vb (step P2). And it investigates whether CPU21 is Va=Vb (step P3). In step P3, if it is not Va=Vb, CPU21 will make the comparison electrical-potential-difference value Vb a reference voltage level Va. That is, let the measurement electrical-potential-difference value of a two-times eye be a reference voltage level (step P4). Then, CPU21 initializes the coincidence counter to build in (step P5), and returns to step P2.

[0020] On the other hand, in step P3, CPU21 increments a coincidence counter as it is Va=Vb (step P6), and it investigates whether it became the count of a convention to which the number of counts of a coincidence counter was set beforehand (step P7). As for CPU21, step P2 is again performed as the number of counts of a coincidence counter is under a count of a convention.

[0021] Thus, at step P2, the third electrical-potential-difference value is measured one by one, and step P3 thru/or P7 are performed as mentioned above by making this measurement electrical potential difference into the comparison electrical potential difference Vb.

[0022] In step P7, if the number of counts of a coincidence counter turns into a count of a convention, CPU21 will change and output the comparison electrical-potential-difference value Vb (or reference voltage level Va) to coordinate data Va' (step P8). (notice)

[0023] As mentioned above, the count of a convention beforehand appointed in this invention (for example, since the comparison electrical-potential-difference value Vb (or reference voltage level Va) is changed into coordinate data Va' and it was made to output it when the reference voltage level Va and the comparison electrical potential

difference Vb were in agreement n times (n is two or more integers) (notice), when chatter occurs, coordinate data with few errors can be obtained compared with the technique equalized like before.)

[0024]

[Effect of the Invention] As explained above, since it was made to output coordinate data when the count of a convention and reference voltage level which were defined beforehand, and the comparison electrical potential difference were in agreement, when chatter occurs, by this invention, it is effective in the ability to obtain coordinate data with few errors compared with the technique equalized like before. That is, according to this invention, even if chatter occurs, it is effective in the ability to obtain exact coordinate data.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is a flow chart for explaining an example of the touch panel scanning method by this invention.

[Drawing 2] It is drawing for explaining the principle of touch panel equipment.

[Drawing 3] It is a flow chart for explaining the conventional touch panel scanning method.

[Description of Notations]

11 12 Resistance plate

11a, 11b, 12a, 12b Electrode

13 14 Switch

15 21 Control unit (CPU)

16 Touch Pen